

Type of Report: Quarterly, January - March 1992. Alfredo R. Huete, University of Arizona
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OBJECTIVES

1. To study and understand vegetation index behavior over different biomes and different periods of the year.
2. To standardize vegetation indices to external measurement conditions (atmosphere, sun and view angles, substrate background).
3. To functionally couple the vegetation index to plant physiological parameters.

In the short term, vegetation index studies are being conducted over several semi-arid vegetation conditions in Niger and Arizona/ Mexico in order to analyze the angular anisotropic responses of each of these sites and relate the vegetation index with APAR, LAI, biomass, and seasonal production.

TASK PROGRESS

1. NIGER-HAPEX ACTIVITIES: A meeting was held in College Park, Maryland, March 26-27 of the U.S. participants involved in the Niger- HAPEX campaign this summer. I attended the meeting along with one of my graduate students, Wim van Leeuwen. On March 26, we discussed the deployment of the C-130 and the impacts of a canceled NASA aircraft campaign. Of vital interest to MODIS activities are the ASAS flights to be carried out during the Special Observation Period (SOP). These flights will cover grassland, grass-shrub mixture, millet, and degraded shrubland study sites with a string of observations to be made along the principal plane as well as at a plane orthogonal to the principal. These flights are to be supported by a ground campaign involving a BRF apparatus, CCD digital cameras, yoke-exotech transects, low level exotech airplane transects, and ground biomass clippings. The objective is to model the angular- vegetation index behavior of each of the sites and functionally relate the vegetation index to APAR, biomass, and LAI.

The second day of the meeting was devoted to a specific 5-month Niger campaign being carried out by a smaller subset of investigators (including myself) from the U.S. team. This 5 month-long campaign has the objective of analyzing vegetation optical dynamics from green-up' through the peak of the growing season and into the dry down senesced period. We are interested in relating remote sensing data to season long vegetation activity, particularly plant physiologic activity.

2. MSS-TEST SITES:

As part of MODIS land team activities, I was responsible for putting together a global MSS test site selection for initial development of MODIS land cover, vegetation index, and other land related objectives. 50 MSS scenes are to be provided to us from the Eros Data Center (EDC) in Sioux Falls. After receiving a final team selection of sites which included LTER, IGBP, IBP, MAB, NPS, and Eos-IDS study areas, a request was made to the EDC to list all available MSS images for these sites in the early 1970's and late 1980's during the growing seasons (spatial and temporal windows were provided to them).

3. AVHRR STUDY SITES:

A 2 day meeting at the EDC (April 1-3) was arranged to coordinate the MSS site selection as well as to explore the use of 57 AVHRR test sites compiled by the EDC from 1989-1992. This daily data set includes all 5 channels as well as angular (sun and view) data and NDVI. This data set will need to be packaged but will provide valuable information for development of compositing techniques and testing of vegetation indices and land cover algorithms.

NEXT QUARTER ACTIVITIES

1. An agreement was worked out with the EDC for me to send a graduate student for a portion of the summer to work on the AVHRR data set as well as to be trained in their activities related to MODIS.
2. 2 graduate students (one funded through MODIS) will leave for Niger for the entire summer period (June-October) to perform both optical and biophysical characterization of several Sahelian cover types.
3. One graduate student and myself will be participating in a Landsat 5 TM campaign at Walnut Gulch from April through November, 1992. As a result of a grant awarded to Dr. Susan Moran (USDA-ARS), we will be provided with no cost Landsat imagery for 8 months.
4. Lab related activities that will be initiated next quarter include (a) start MODIS simulation work from Landsat data, ASAS data, and ground- based field data; (b) start processing dry and wet season ASAS data collected over Walnut Gulch in 1991.

PUBLICATIONS

Huete, A.R., Hua, G., Qi, J., Chehbouni, A., and Leeuwen, van W.J.D., 1992, Normalization of multidirectional red and NIR reflectances with the SAVI, Remote Sens. Environ. (In press).

Huete, A.R. 1992, Extraction of soil and vegetation parameters from high resolution bi-directional reflectance spectra, To be presented at IGARR's Symposium, Houston, Texas May 25-29, 1992. Final manuscript will be submitted to IEEE.

Qi, J., Huete, A.R., and Chehbouni, A., 1992, Solar, view angle and scale interactions on high resolution spectra from a semi-arid watershed, Submitted to Water Resources Research (March, 1992).

Ruyle, J., Huete, A.R., Weltz, M.A., and Cox, J.R., Surface reflectance dynamics of a semi-desert grassland, Submitted to Water Resources Research (March, 1992).